American Electro-platers' Society

(An Educational Society)

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MONTHLY REVIEW

NOVEMBER, 1915

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INDEX

	Page
Editorial	3
Cobalt Echoes	4
Plating Plaster of Paris Statue	7
The Action of Colloid Addition Agents in Electroplating Baths	10
Copper Plating for Purposes Other Than Ornamental	12
A Talk on Rheostats	13
Removing Carbonate from Silver Bath	14
Plating Large Pieces	15
Progress	15
Milwaukee Branch Discussions	16
Extracts from a Letter from E. W. Heil, Wichita, Kan.	16
What the Branches Are Doing	17

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I shall pass through this world but once. Any good thing, therefore, that I can do, or any kindness that I can show to any human being, let me do it now. Let me neither defer nor neglect it, for I shall not pass this way again.—*Amiel.*

MONTHLY REVIEW

American Electro-platers' Society

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Vol. 2 NOVEMBER, 1915 No. 6

EDITORIAL.

By W. S. Barrows, Supreme President.

The "regulars"—those who seldom miss a meeting throughout the whole year—are attending the branch meetings as usual and aiding in the transaction of business. Here and there we notice an application for membership has been made. A great interest is being shown in the work at the various laboratories. Interesting discussions at nearly all sessions are reported by many of the branches. In fact, the present is yielding good results. *But* we can do better. The cry of "war times" which is heard from many sources when an excuse for inactivity is desired, can not be regarded seriously. Now is the time to prepare for the future. Progressive platers are always active, and if business depression during the present war has affected the output of your shop, you doubtless have a better opportunity for concentration of thought upon some problem which has perplexed you, or greater energy for work which may be in the nature of recreation. Recreation, you know, is not idleness; it is simply a change. If you are honestly interested in self-improvement, or the advancement of knowledge among the members of the A. E. S., you have no time for worry, even during war times.

It behooves you and every member of your branch to attend, aid and support the officers and willing workers of your particular branch. You can render valuable assistance by securing new members. One new member secured by you would encourage others to make an effort. Surely you know a plater who would make a good member. Possibly a personal visit would secure his application. Each new member increases the importance of yet another plater doing likewise. The greater our number, the stronger will be our drawing power for still other platers. If we are a body of men seeking education, we must bestir ourselves and reach out for others, strengthen our ranks and work together for a common end.

In conclusion, my parting word is a maxim of Napoleon's—"Unity of command is the first necessity of war." Let us be a unit in our endeavor to promote all the interests that tend to a unity of command, not only in the individual branch, but throughout the entire society. During the winter months we can achieve splendid success if every member will put his shoulder to the wheel and exemplify the principles embodied in our most excellent mottor—the lines from Amiel.

W. S. Barrows.

COBALT ECHOES.

By W. S. Barrows, Toronto.

Since the presentation of the paper, "The Use of Cobalt for Commercial Electro-Plating," at the convention of the American Electro-platers' Society at Dayton, Ohio, June, 1915, the writer has received a number of inquiries regarding the appropriateness of cobalt electro deposits for special purposes. The manufacturer who has experienced more or less difficulty in the past with his nickel plated or electro galvanized product, has earnestly considered the various valuable properties of the metal cobalt and has either submitted samples of the product for treatment or has installed a small experimental bath in his plating room.

Some platers who attempted experiments with cobalt plating baths have chosen a cheap formula or used an inferior anode. Some have used cobalt salts with nickel anodes; others, nickel salts and cobalt anodes.

Among more than a score of cases heard from, only two (2) have in any detail approached the formula as given by Dr. Kalmus and his associates, yet the failure of the substitute bath to produce results approximating the results possible with *Bath XIII B* has caused some of these experimenters to regard the metal cobalt as of comparatively little value to the electro-plating industry. In several cases the tests were discontinued after a few trials, while in other cases the plater altered his bath, improved his anode surface and as a result became converted to the cobalt idea.

One plater prepared a bath containing approximately two (2) pounds of cobalt sulphate per gallon and used nickel anodes of uncertain purity. The first deposits were such as to indicate a very efficient bath, and the operator was quite pleased, the plates being of good color and easily finished. After a few days' use the bath began to grow less pleasing, the deposits less attractive; the yield was apparently but little superior to ordinary nickel plate; the speed of deposition had diminished; the density of the bath was reduced; some of the plates scaled very easily. The plater reported the cobalt idea as being a "fake" and absolutely no good.

We could mention possibly a dozen different ways that cobalt has been introduced into a plating bath, and in every instance the bath has been regarded as a cobalt-plating bath.

The object of this article is to endeavor to assist those platers who may be interested in cobalt plating and have met with repeated failures in their experiments.

To insure best results when hardness of deposit, distinctive color of finished plates, speed of deposition, uniform and constant concentration of the electrolyte, and the general high efficiency of the electrolyte are the principal features of interest, we invariably advise the plater to prepare and operate the cobalt bath as described by the originators. Boiling the solution when preparing the bath is unnecessary; the boracic acid will dissolve in water below the boiling point and the cobalt sulphate readily dissolves in water at a

much lower temperature. Unless the maximum quantity of cobalt sulphate and boracic acid is employed, the extremely high current densities advised for best plates cannot be obtained without disastrous effects to the deposit.

It is also advisable to operate the bath with both voltmeter and ammeter connected, the remarkable properties of the bath may then be more accurately and quickly ascertained and less defective plates produced. Determine the surface area of the article to be treated before beginning and adjust the current accordingly. After a few trials the approximate surface area of an article can be judged with considerable accuracy.

As several inquiries received were relative to difficulties experienced in boosting the proper current densities when large pieces have been plated we will select a typical query and the reply given.

The explanation of the trouble forms a very simple answer to queries of similar nature regarding nickel solutions or solutions in general and for this reason is incorporated in this article. A plater writes as follows:

"We are able to plate pieces which have a total surface area of about 72 square inches, with a current density of 150 amperes per square foot, at 4 volts. But when we attempt to plate a surface area approaching one and one-half square feet we cannot get current enough through the bath at four volts to give us a current density sufficiently high to treat the work properly in the time given the smaller piece. Our connections are perfect and wires are of ample size. Several trials have proven failures. Kindly explain the reason for this difference."

ANSWER—We note you are perplexed because you obtain a higher current density at a given voltage, using a cathode of 72 square inches area, than you do at the same voltage using a cathode of approximately 216 square inches area, all other conditions being the same. That is to say, the electrode distance in both cases was six inches and the anode surface area was the same, presumably less than two square feet.

It is not difficult to see that this should be as you have found it. With a given solution and with anode and cathode area identical, the current density is independent of the size of the cathode and anode. This is true because so long as they are always kept the same size, doubling their area causes the resistance of the effective solution to be halved, with consequent double the amount of current. Since cathode current density is total current divided by cathode area, this doubled amount of current is divided by double the cathode area and the current density remains the same.

This assumes that the bath is large compared with the volume included between electrodes. This is true under ordinary commercial plating conditions. If it were not, you would get a number of irregular effects.

In your trials with the 216 square inch cathode and anode were about the same size. In your treatment of the 72 square inch

cathode, the cathode was considerably smaller than the anode. With a cathode smaller than the anode, doubling the cathode area does not halve the resistance of the effective solution. This is obvious, because in order to halve the resitsance *both* cathode and anode have to be doubled in area. Consequently when you double the cathode area alone, you have not doubled the conductivity of the effective bath, but you have doubled the area by which you divide to compute current density.

Therefore, doubling the cathode area, when the cathode is smaller than the anode, will give you a lower current density, although the total current is also increased. And this is exactly what you found, except that you tripled the cathode area from 72 square inches to 216 square inches instead of doubling it, as in the illustration here given. You found the current density was lower with the increased cathode area. In order to boost up this current density, with the increased cathode area, you must either operate at a higher voltage or increase the anode surface.

As the above case is typical of many others, we now advise connecting the cobalt bath to a 10-volt circuit if such conditions are met in practice. We have produced splendid plates with 6 to 8 volts, and for some lines we prefer to operate the bath with the higher voltage.

One other point which has repeatedly been presented to us for consideration is: The production of whiter deposits from the cobalt sulphate bath, particularly for ground work and cheap wares which are not buffed.

In trying to solve this problem we have hit upon a method which is proving quite satisfactory to those concerned. It requires a slight departure from the true cobalt bath as mentioned previously.

When backgrounds or portions of relief are required to be whiter than the true cobalt metal deposit, we have found that a decidedly whiter deposit may be obtained by using nickel anodes in the bath in the proportion of 6 square inches nickel to 72 square inches cobalt. Both nickel and cobalt anodes to be of highest standard of purity obtainable.

A BAD PENNY

Among the offenders brought up before a city Magistrate was a shabby-looking man who was charged with having no visible means of support.

"What is your occupation?" asked the Magistrate, sternly.

"Ain's got none, sir," was the calm reply. "At present I'm doing nothing; just circulatin' round, so to speak."

The Magistrate turned to his clerk.

"Please make a note," he said, "that this gentleman has retired from circulation for 14 days."

PLATING PLASTER OF PARIS STATUE.

(Read before the Cleveland Branch by CHARLES WERFT, Cleveland Branch A. E. S.)

In the plating of plaster of paris, which is not a hard proposition, if care is taken in the different processes through which the statute passes through before it can be successfully plated, these processes I will endavor to describe to you in as comprehensible manner as I can. I have read numerous articles on this subject, and after trying out the processes described in these articles have found that the author has left out some important step, or detail that prevented successful plating of the plaster of paris, this fault I will try to eliminate, explaining each step through which the plaster of paris must pass through, and the wherefor of it.

The statue should be thoroughly dry, if it is not dry the next step through which it passes will be of no avail, as the foundation of a house must be well laid to hold the edifice, so must the foundation on the statue be well laid or rather soaked in to hold the plate that is to follow. This foundation is a wax, which must be hot, any kind of wax will answer this purpose, beeswax, paraffine wax, the statue is placed in the hot wax, and left in it till the bubbles—which appear—stop coming to the surface of the wax, which will indicate that the statue is saturated with the wax. The idea of using wax is to make the plaster of paris water proof, if the plaster of paris is not placed in wax, it will absorb the solution, and will crack, or split while plating, therefor the use of the wax. After the statue is saturated with the wax it is taken out, and left to cool, when thoroughly cool it is then shellaced, and set aside to dry. The shellac should be very thin, as too thick a shellac will make ridges on the statue, the use of the shellac is the foundation of the next step. After the statue has been shellaced, and dried, it is sprayed with a copper powder—this step the writer considers one of the important features in the plating of plaster of paris—the selection of the copper powder that the statue is to be sprayed with; the powder should be free from all oil and grease, as copper powder that has these matters in them will retard the plating. The powder is held on the statue with a binder, the writer has used a lacquer for that purpose, the Egyptian Lacquer Co. and Celluloid Zapon Co. manufacture these lacquers, and thinners for this purpose. By experimenting with different proportions the writer has found that a mixture of one-quarter lacquer and three-quarters thinner makes a very good binder for the copper powder. Weigh out two ounces of the powder and pour this in a pint jar with the binder already mixed, and thoroughly stir the powder in the binder; then use an air gun, or spray, a camel hair brush can be used but with a spray better results can be derived.

When the statue has been sprayed with the copper powder, the binder has a tendency to soften the shellac, which helps to hold the binder and powder to the statue. In the spraying care should be taken that the statue is thoroughly sprayed with the powder, then set the statue aside to dry, which will taken one-half hour, dry

enough so a coat of tin powder can be sprayed on it. The use of the tin powder is not essential, but its use is advocated here to detect that the statue is thoroughly sprayed with the copper powder, and an aid in the next step of spraying. After the statue is dry after spraying on the tin powder, it is then resprayed with the copper powder, of which this is the last coat, here is where the tin powder comes in for its use in detecting that the statue is thoroughly sprayed with the copper powder, if the statue is not covered thoroughly the tin powder will show, thereby necessitate another coat of the copper powder. It is then set aside to dry thoroughly, when dry take the statue and wind fine copper wire around it, a number 30 gauge wire is very satisfactory, care should be taken that in the winding the copper powder is not scratched, where the copper powder has been scratched it can be repainted with a camel hair brush with the copper powder. Wind the 30 gauge wire around the statue loosely, care being taken that the wire is not binding on the statue, for in the plating this wire will become taut, and eventually plate on the statue. When the statue has been wound with the 30 gauge wire, wrap two feed wires around the statue loose, a number 18 gauge wire will answer the purpose, as plaster of paris will float in the solution, there should be a weight placed on it to hold it in the solution while plating. The writer has used lead pipe for this purpose, that has been previously insulated with rubber hose the thickness of a match. The weight is placed on the bottom of the statue.

The solution for the plating of plaster of paris is the well known duplex acid copper solution, made up as follows: Water, 1 gallon; sulphate of copper, 1¾ pounds; sulphuric acid, 3 ounces. The solution should stand 15 degrees on the hydrometer before the acid is added, and after the acid is added it should stand 18 degrees. The solution should be agitated with air, as an agitated solution will plate more uniformly than a still solution, and will not cause pebbles to form on the bottom and edges of the work. If during the plating the anodes become covered with a dark slime, or powder, one ounce of dextrine to every five gallons of solution will overcome that difficulty and help to overcome a brittle deposit. The statue after being wrapped with the 18 gauge wire and a weight placed on the bottom, is hung in the solution, and the current turned on. Use a small voltage until the tank is filled with work, one volt will be sufficient. After the tank is filled two volts can be used without fear the work will burn or pebble.

When the statue has been plating for one hour take it out of the solution and rinse in clean water and dry off with a rag, or ues a small pressure of air to dry it off, but do not use sawdust to dry the statue off, as that will injure the plate, that is very thin, and help to rub off the copper powder where it has not been plated.

The statue should not be taken out of the solution too often, nor should it be kept out too long while retouching the spots that are not plated, as each time the statue is taken out there is another coat plated on it. Say we take the statue out four times, there will be four separate coats of copper plated on it. The writer has plated

statues that were taken out of solution half dozen times. When the buffer finally got the statue and polished, you could see the six separate coats of copper, and when tried to buff the edges of the copper would turn up. After experimenting I found that the addition of dextrine, the white, overcame this difficulty to a certain extent. A person hears so much about avoiding placing chemicals in solutions that will cause inert matter to accumulate in the solution, but the writer cannot see any harm to result from the placing of dextrine in an acid copper solution—at least he has not had any trouble from its use—when the results are better than when not placed in solution. The writer has been asked if he has ever had any trouble of black streaks appearing in the plating of plaster of paris, and what would be the cause of those streaks. Have never had that trouble whatever. The only cause that I think would cause those streaks is the improper mixing of the binder that holds the copper powder, when the lacquer is not thoroughly mixed with the thinner. The writer does not think that the addition of dextrine will cause those streaks, as he has always used dextrine and never had that trouble.

When the statue has been dried loosen the number 30 gauge wires carefully, so as not to pull off the plate that has been formed. Where the statue has not been plated repaint with the copper powder and leave it dry before replacing in the solution. When dry replace in the solution, leaving it plate a couple of hours before examining again.

The statue can be plated for ten or twelve hours and a good deposit can be obtained, but not sufficient to stand polishing or buffing. The writer has plated plaster of paris for 96 continuous hours, after which the statue was roughed out with a 60 emery wheel, 80'd, fined and buffed. The statue weighed 45 pounds before plating. After plating it weighed 70 pounds.

This shock of oats has gone through the same process as the statue referred to above.

HONEYMOONERS.

I just got back from a trip to Bermuda. There wasn't a single passenger on the boat besides myself."

"That's strange."

"Not at all. They were all married."

The habit of just "getting by" is one of the worse conditions a man can get into. It is much the same as the fellow who thinks that most anything is "good enough." The man who is content just to "get by" will never "get anywhere."

Don't dawdle in the hope that inspiration will strike you. Inspiration is more likely to strike the busy man than the idle one.

THE ACTION OF COLLOID ADDITION AGENTS IN ELECTROPLATING BATHS.

A strong temptation assails me to again emphasize certain reforms in the conduct of the Review, which were advocated in my article in the April, 1915, number, for in glancing over the files one cannot but be impressed with the fact that, had the correct information contained therein been presented in an orderly manner in the form of *courses* of *study* and the mass of misleading misinformation weeded out, the society would, by now, possess a tremendously valuable reference work.

However, the misinformation still comes albeit, there seems to be difficulty in eliciting even this. One flagrant case demands correction—viz.: the inference on page 4, August, 1915, issue, that the conductivity of a *metal* is necessarily proportional to the electrolytic conductivity of aqueous *solutions* of *salts* of the metal. The conduction of electricity in metallic bodies is known to be a process quite different from conduction in electrolytes which are decomposed in the process, and it is exceedingly misleading to give the impression, as does this article in question, that, because the conductivity of copper differs from the conductivity of zinc, the conductities of their salt solutions differ accordingly. The theory of electrolytic conduction has already been explained several times in the Review (see "The Why of Electroplating," Feb., 1912; "Resistance and Electrolysis," Aug., 1913, "The Tonization Theory," Sept., 1914) and any further explanations along this line seem superfluous.

However, there is an aspect of electrolysis which has always been a mystery to us, *i. e.*, the action of colloids upon electrolytes and the effect upon the cathode deposit, of colloids in the bath. Possibly some of you have speculated as to the nature of the process by which the presence of such colloids as glue, glycerine, gelatin, etc., in a solution, sometimes renders the deposit more dense and adherent. It has been assumed, for example, that this action was purely mechanical, the colloid simply entraining and precipitating the insoluble foreign matter in the bath. It has also been assumed that a chemical reaction resulted in the formation of new compounds which in some mysterious way, changed the deposit. But I can find nothing in the Review which in any way explains this phenomena, and it occurs to me that possibly some recent theories and experiments along this line may be interesting to our members.

The results of some very valuable work on addition agents were presented in two papers by A. Mutscheller in the June and July issues of Metallurgical and Chemical Engineering. This author determined experimentally that by adding gelatin to silver nitrate solutions, the migration velocities of the anions were profoundly changed. That is, the presence of gelatin seemed first to slow up the transfer of the nitrate ions toward the anode, and then when the percentage of gelatin reached a certain value, the direction of migration was actually reversed. This means that in some cases

both the silver and a complex of the nitrate ions with gelatin were deposited on the cathode. The character of the deposit changed from a loose tree-like form at the start, with no gelatin in solution, to a dense pure white smooth *plate* with .2 per cent gelatin, and finally became black with .4 per cent added, when the anion went to the cathode.

Similar experiments with copper sulphate gave similar results except that about 45 times as much gelatin was required. In all cases, the best deposit was obtained when the amount of colloids added was just enough to stop the migration of anions. But naturally, in order to obviate the necessity of constantly adding more colloid material, the anion must in some way be made to unite with or "dissolve" the anode and in so doing, set free the colloid for further service. To accomplish this it is merely necessary to agitate the solution, thus bringing the anion adjacent to the anode by external mechanical force instead of the force of the electric field.

The mechanism by which this motion of the anions is arrested is assumed to be the neutralization of the electric charge of the anion by the charge on the colloid, which thus unites with and neutralizes (electrically) the anion. There is practically no loss of colloid chemically except through reaction with free acid, if such is present in sufficient quantity.

To sum up the results therefore, it may be stated that the condition which produces the best plate in any bath is one in which all the electricity is carried by the cations and the anions are completely neutral and return to the anode by mechanical means; and further that this condition may be brought about by introducing into the bath a quantity of positively charged colloidal material sufficient to neutralize the negative charge on the anions, thus allowing the cations to migrate to the cathode as fast as they are deposited out.

It may be assumed further, that in any commercial plating bath, the production of the most satisfactory deposit necessitates not only a constant concentration of metal ions at the cathode, but in some degree the application of external means for returning the anions to the vicinity of the anode.

It is highly probable also that in the absence of negatively charged colloids, other materials not apparently concerned in the actual deposition, such as ammonia in nickel solutions, unite with the anions in such a way as to at least partially reduce their migration velocity, and it is hoped that further researches will enable us to exactly arrange the proportions of suitable addition agents so as to control absolutely the migration velocity of the anion in all solutions.

The writer has assumed that his readers are familiar with the Ionic theory; if they are not, it is either because they have not read the three articles in the Review mentioned above, or, reading them, failed to understand. In either event, to review them will do no harm.

COPPER PLATING FOR PURPOSES OTHER THAN ORNAMENTAL.

By E. G. Lovering, *Detroit Branch.*

The object of this article is to call attention to a comparatively new brand of copper plating which has greatly increased the field of electro deposition. Many electroplaters are using these methods of rapid copper plating in commercial up-to-date plating rooms, on a large scale and meeting with excellent results. Such firms as the Sturgus Mfg. Co. of Sturgus, Mich., was one of the first firms brought to the writer's attention to use this method. They are turning out thousands of pieces each day, taking the pieces just as they come from the machine shop, and cleaning and depositing copper simultaneously.

The Buick Motor Car Co., Lewis Spring & Axle Co., Prestolite Co. of Indianapolis, and others too numerous to mention.

The automobile trade in general are installing copper plating plants for copper plating such parts as cam shafts, gears, etc., previous to hardening. The blank gears and cam shafts are sent to the copper plating department. They are then sent back to the machine room, where the cam shafts are machined, the teeth are cut on the gears, then they are sent to the heat treating and hardening room. The exposed steel is hardened and the parts having a coating or deposit of copper are left soft, as the cyanide hardening process does not penetrate the copper. Wire wheels, spokes, nipples, rims, etc., are copper plated before they are painted and enameled. Radiators or coolers are also copper plated, that is, those that are made of sheet steel previous to enameling. A local firm making wire wheels have a copper plating plant with a capacity of 200 sets per day. The wheel is all assembled in the assembling room, placed in a runway, where, by its own momentum, it runs to the plating room, where it is attached to a carrier which runs to the cleaning and plating bath, entering at one end and mechanically moving through the solution till it reaches the other end of the tank, where it is hoisted out into a hot water bath, then blown dry with a pressure of air, when it continues on its journey to the enameling department. Parts that require a driven fit, such as axle cones, shafts, etc., are copper plated from .001 to .004, then driven into place, making a fit that seldom vibrates or shakes loose.

The solutions used for this kind of work are various, some plates using the carbonate of copper, others the metal cyanides, while a good majority are using the cleaning and plating solution

as described by the writer in the April issue of the Metal Industry, while some are using soda ash instead of lye in solution.

The work needs no preliminary cleaning, going right into the bath as it comes from the various departments.

Sheet steel, tubing, drop forgings, etc., that have a fire scale, that are not pickled in the ordinary pickle, are put through an electro pickle bath composed of sodium nitrate and water, used the same as an ordinary electro cleaner, using the reversed current. This gives excellent results as a pickle, as the disagreeable fumes that arise from the sulphuric or muriatic acid pickle are eliminated, leaving the work smooth and not pitted.

A TALK ON RHEOSTATS.

By the EDITOR.

A rheostat is an instrument or device for controlling the electric current. It picks chestnuts out of the fire for the plater. It keeps the cathode from burning, but often gets itself burnt in the attempt. A rheostat is a great manufacturer of ohms. Ohms are all right in their place. They are of great value to the electric light and power companies. A few healthy ohms on the business side of an electric meter will cause the recorder to revolve like a pin wheel on the Fourth of July, producing 8-cylinder cars and winter homes in Los Angeles for the stockholders. The only place where ohms are visible is on your electric light bill. Ohms are very elusive and as hard to find as a splinter on the sole of your foot. They are of no value to the plater. Their production can be lessened by the use of the field rheostat instead of the tank rheostat. Rheostats are made of various materials, some are more various than others. German silver is still being used by many rheostat makers. Like Limburger cheese, German silver is still apparently obtainable in spite of the war. Much hot air is often circulated in rheostat discussions. This is not necessary, as rheostats themselves are great hot air producers. I have used rheostats which would not take a back seat to a steam radiator as a heat producer. Rheostats are as tricky as spark plugs and must be kept clean, or they will balk.

When a tank full of work has not started to plate after 15 minutes, it is because the lever has been left on the cut out. Work cannot be plated this way, and the lever must be put on the right point, when the plating will proceed properly.

This shows how necessary rheostats are. In the research work necessary to collect this data we have been unable to find who put the H in rheostat. We are, however, of the opinion that he was not an Englishman.

REMOVING CARBONATE FROM SILVER BATH.

By SAMUEL BARR, President Philadelphia Branch.

There has been a great deal said and written about carbonates in cyanide baths.

The method I use to remove sodium or potassium carbonate from a silver bath, is calcium cyanide (Ca. C. N.). It is obtained by adding excess of powdered Vienna lime, (Ca. O.) to Hydrocyanic acid (H. C. N.) and filtering the excess of lime remains behind, and the calcium cyanide (Ca. C. N.) is in the liquor, it is best when made fresh.

Withdraw part of silver solution and put into a stone crock or other receptacle, add your calcium cyanide (Ca. C. N.), a white percipitate of calcium carbonate (Ca. C. O.) will form, leave stand twenty-four hours, or filter at once, then return the solution to tank again, wash the calcium carbonate with clean water, add wash water to solution.

In this way you get rid of your carbonate in your solution, which I think is much better than adding Hydrocyanic acid to the bath. I would not advise removing all the carbonate at one time, but a small amount could be removed from time to time, the amount left to the best judgment of the plater.

A small amount in the bath is not harmful, but when in excess it increases the resistance of the bath, I use one volt for plating and iron wire on my anodes.

I have used this method quite a few years with good results.

To test the calcium carbonate after being washed, to ascertain if it contains any silver, put some calcium carbonate in a test tube, add nitric acid, dilute with distilled water, then add to this, diluted muriatic acid, if it contains any silver, will show a silver chloride percipetate.

BROTHER PLATER, READ THIS.

Do you like the Review? Do you like to read it? Can you find things in it that are of value to you? If you think it is a good thing help push it along. It can be made much more valuable if you will help. It is your paper. I am your servant. I am anxious to serve. Are you willing to help? Every practical plater knows *something* that would be of benefit to his brother plater. Get your ideas or experiences on paper, read them before your branch, send them in to the Review. Help to make every number of the Review a valuable addition to the Platers' Library.—EDITOR.

PLATING LARGE PIECES.

F. C. RUSHTON, St. Louis Branch.

A simple contrivance for the plating of large tops or any article where the edge comes very close to the center line of anodes is a knife switch on the center line of anodes. They can then be thrown out of commission the first half of plating period and thrown into commission the second half, thus preventing burning or a heavy granular deposit on the edge. It will also be a saving of metal in plating articles that cannot be hung double, or back to back, and require a deposit only on the face.

PROGRESS.

When it comes to education,
Looking at it from our station
In an editor's relation,
We just think we are all right.
This society of platers,
This great bunch of educators,
Ignorance emancipators,
Are all reaching for the light.

Dandy papers we're receiving,
Fine work branches are achieving,
So we just can't help believing
That our progress will not stop.
'Cause our art needs elevating,
And we all want better plating,
Under old methods we are hating,
We are climbing to the top.

Now we know we've got the backing,
No co-operation lacking,
Not a branch the work is slacking.
So we can't help feeling big,
We can't keep down our elation,
For in plating education,
Every other plating nation,
We will put right on the pig.

H. J. RICHARDS.

HARDWARE GREENS ON BRASS.

Nitrate of iron gives better results in producing hardware greens upon cast brass or sheet metal goods than acetate of lead. The usual method is pursued of dissolving the nitrate of iron in hyposulphide of soda—one ounce of the iron in four to eight ounces of the soda in each gallon of water. Use hot.

MILWAUKEE BRANCH DISCUSSIONS

Question: What will remove black nickel?

Answer: Use two pounds potassium cyanide to one gallon of water.

This solution will remove a light plate of black nickel, or H^2SO^4 sulphuric acid and water to stand 45 per cent Beaume. Use a reverse current, as much current as possible, and cast iron anodes. This will remove the plating and leave the article in the same condition it was before plating.

Question: What kind of a lubricate can be used to the best advantage in a steel ball burnishing barrel?

Answer: Use electric cleaning compound about one-half pound to 15 gallons of water or stronger if devised, or borax soap chips, about one-quarter pound to 30 gallons of water. The best lubricate for all round purposes is Peruvian soap bark. This soap is very slimy. It is prepared as follows: Steep two and a quarter pounds in 30 gallons of hot water. Use twice as many steel balls as you have work in the barrel, then revolve about twenty revolutions per minute. This Peruvian soap bark solution as above, with about one-eighth ounce of cyanide potassium, will act as a preventitive of tarnish, following a bright nickel solution.

Question: Has any member used carbonate of lead for a brightener in a cyanide copper solution, and with what results?

Answer: Carbonate of lead turned the work to a bronze color, which was not durable, and coated the anodes very heavily.

We would like to have members of various branches answer this question. How can a pickel be made for steel stampings, that will remove oil scum and scale and permit the stampings to be immediately rinsed and plated without peeling or blistering?

EXTRACTS FROM A LETTER FROM E. W. HEIL, WICHITA, KANSAS.

I think we all realize how great a part nickeling takes in the plating industry and how small a space writers usually devote to nickel plating in their books. However, before I attempt any more on nickel plating I will describe rheostat and current regulation. The control of the current is not explained simply enough to the plater, who will not take time to study it out.

Don't you think some of the writers in trade journals and the Review describing a reaction in solution, are doing so in a very exasperating way to the average reader. If one should attempt to study out the reactions which are sometimes symbolized, he forms an opinion that the eons are hopping about like corn in a popper, when in fact they move slowly, being greatly assisted by agitation. Verily, they should can such junk and get down to where they can do the most good.

We wish to say that we were so disappointed at not receiving Mr. Heil's promised paper on rheostats in time for this issue of the Review that we wrote one ourselves, originally thought out by us.—EDITOR.

WHAT THE BRANCHES ARE DOING

Dayton, Ohio, Nov. 2, 1915.

Mr. H. J. Richards, Editor A. E. S.

DEAR SIR: Under date of Sept. 16, 1915, a circular letter was addressed to all of the branch societies calling for a referendum vote on the question of levying a thirty-five per cent (35%) per capita tax, with a monthly issue of the Monthly Review, the expense of publishing the "Review" to be borne by the Supreme Society, and to abandon the present method of charging the branch societies for the number of copies ordered by them, or, to levy a twenty per cent (20%) per capita tax and to issue the "Review" as a quarterly for the balance of the fiscal year.

Fifteen (15) of the branches have returned their vote, twelve (12) branches voting for the thirty-five per cent (35%) assessment and three (3) branches voting for the twenty per cent (20%) assessment. One branch has falled to make any return.

In conformity with the expressed will of the majority the Executive Board have therefore levied the per capita tax for the second quarter of the fiscal year on the basis of thirty (30) per cent. of all dues received. This assessment is due and payable to the Supreme Secretary on the 15th of November.

The Executive Board have further levied the per capita tax for the third and fourth quarters of the fiscal year on a thirty-five per cent (35%) basis. These assessments will be due and payable to the Supreme Secretary on Feb. 15, 1916, and May 15, 1916, respectively.

The reason for the thirty per cent (30%) assessment for the current quarter is that the payment made for the September issue of the Monthly Review will just about balance the difference betwen the thirty per cent (30%) and the thirty-five per cent (35%) assessment voted for. The Executive Board have also fixed the number of "Reviews" to be furnished each branch at the number on which the branch pays per capita tax, plus one for the secretary's file.

A number of the branch societies have forwarded protests against the amendment to the Constitution admitting assistant foremen to active membership in the society. This amendment was adopted at the Dayton convention, June, 1915, and is as follows:

"Any plater who has served five (5) consecutive years as an assistant foreman may become an active member of this society, providing that he shall show a suitable proficiency in the knowledge of the art and is recommended and vouched for by his foreman, who must be an active member in good standing. In no establishment shall there be more than three (3) members of this society."

In view of this protest the Executive Board call for a referendum vote of the members on the question of rescinding this amendment. If your branch is in favor of rejecting this amendment, vote YES, and if you favor retaining this amentment, vote NO.

Kindly return the result of your decision, certified by your president and secretary, to the Supreme Secretary for the consideration of the Executive Board. The result of the ballot will be made known to the branches by the Executive Board.

Yours very truly,

WALTER FRAINE,

Sec. Treas., A. E. S.

FOOLISH QUESTIONS.

By E. J. LOVERING, Detroit Branch.

If September Morn went to her nickel bath would the volt meter?

Or, would the rheostat show "Resistance."

If she fell into the black nickel would the electric cleaner?

If the cyanide copper and the acid copper started trouble, would the nickel stay "neutral"?

If Bro. Williams ate a piece of emery cake, would it hurt his "metric system"?

Could a plater be called a gardener if he has charge of a plating "plant"?

Because the country hasn't any "Bryan" if a reversed current struck the A. E. S. would the platers be at S. E. A.

If the cyanide mixture told an untruth would the potash "lye"?

If the hydrometer stands at 5 does the nickel "lay down"?

If the plater changed his clothes would the nickel "strip"?

Could "Ca." be called a policeman because it stands for "copper" and is connected with the electromotive "force"?

If the scrub boy lost his lunch would he preserve the "current"?

If the dynamo was caught sparking would the current be discharged and have to be sent ohm?

When the plater washes his "precipitate" does he hang it on the "alka-line"?

If the Branch secretaries don't all get in line will we have a good "Review"?

TORONTO.

Meets fourth Thursday of each month at Occident Hall, Bathurst and Queen Streets. Secretary, Ernest Coles, P. O. Box 5, Coleman P. O., Toronto, Ont.

The regular meeting of this branch held on Thursday, Oct. 28th, must go on record as one of the best. An excellent and enthusiastic attendance, a paper and some interesting discussion, full of ginger, held the attendance to much past the regular time for closing. President Salmon called the meeting to order at the regular time and "'twas nigh to midnight at the close."

The work of the recently appointed organization committee was evidenced with three (3) active members being elected and three (3) more applications received. A request for information regarding "Cobalt Plating" was received from a large concern which indicates the interest being taken in this new disposition. A paper

by Mr. John Young on plating in general, dealing with the various lines, silver, nickel, copper, tin, brass, etc., handled by him, being very well received. Discussions were had on motion plating, rapid plating, single salt solution, and the merits of chlorides and sulphates, comparatively, as conducting salts. All present enthusiastically taking part. Single salts being given the palm, with sulphates as conductors. While the efficiency of the chlorides as conductors was not disputed, the after effects on Terrous metals was considered to make them undesirable and were not to be contended with where sulphates were used. Questions were also asked as to the possibility of plating an alloy of copper and silver, but as the desired finish was not quite clear the matter was laid over.

The Plater Class at the Technical School is now in session for the winter. The members meeting two nights weekly and handling a general line of chemical analysis until the arrival of the generator, when practical plating will be gone more deeply into.

CHICAGO.

Meets fourth Saturday of each month, 8 p. m., Western Building, Randolph Street and Michigan Avenue. Secretary, H. E. Willmore, 5911 South Boulevard, Chicago, Ill.

The regular monthly meeting was held Oct. 23rd, with O. E. Servis presiding.

Messrs. J. P. Manz, Chas. B. Wrout, H. H. Posbeck, W. G. Meggers, H. A. Gilbertson and Wm. G. Bott were appointed a committee to make arrangements for the annual banquet to be held early in December.

An interesting discussion was had as to the causes of brass tubing spotting out after being buffed and lacquered, in which several theories were advanced, the general opinion being that the spots were caused by the method of manufacture.

Librarian W. G. Meggers brought the following questions before the meeting: What causes case nickel anodes in a nickel solution to corrode to such an extent that if the plater wishes to clean them by scrubbing, there is practically nothing left but a black powdery mass?

What causes the voltmeter to rise from zero up to 1 volt when the tank is disconnected at the rheostat?

What is the cause of a copper solution, made of copper cyanide and sodium cyanide, plating a pale copper color instead of a rich red?

In the discussion of the first question, it was suggested that this was more liable to occur when the solution was maintained in an alkaline condition or when an excess current was used.

Question No. 2. The cause was attributed to counter electrolysis.

Question No. 3. It was decided that the paleness of the deposit was characteristic of the double cyanide solution.

DETROIT.

Meets first Tuesday of each month at 26 East Congress Street. Secretary, B. E. Miller, 543 Townsend Aveune, Detroit, Mich.

Just before opening the regular meeting in our new home Mr. C. S. Tompkins introduced to the members of this society, Mr. Smart and Mr. Miller, who are representatives of the Michigan Drug Co. Cigars were passed and we were given a very cordial welcome, which was greatly esteemed by our members.

The regular meeting was called to order by our Vice-President, H. S. Brockway. A large attendance was present.

Moved and supported that secretary voice a vote of thanks of our appreciation for the time and service Professor Moore has rendered in securing for the members of this society a laboratory practice at the Cass Technical High School, which was carried.

Our Supreme Past President, Col. Hausjosten, coming in unexpectedly, was received with a hearty glad hand and was called upon to make a few remarks for the good of the Society.

Mr. Woodmansee, our class instructor in chemistry, was called upon for a few remarks in regard to the progress of the Chemistry Class and a vote of thanks was expressed for his generous thought and time which he has given to the members of this branch.

NEW YORK.

Meets second and fourth Friday of each month at 258 Pearl Street, New York City, 8 p. m. Secretary, Wm. Fischer, 345 23rd Street, New York City.

The regular monthly meeting of the New York Branch was held at their rooms in the Arcade Building, Fulton and Pearl streets, New York, with President Reama in the chair. The laboratory committee continued their instruction on making and maintaining a standard silver solution, showing the method used in testing for the free cyanide content. The work will be continued next meeting.

MILWAUKEE.

Meets first Friday of each month at Eagles Hall, 137 Second Street. Secretary, E. C. Yaeger, 962 9th Street, Milwaukee, Wis.

The last meeting of our branch was a very enthusiastic one, several questions being asked and some answered. Our branch have again started their chemistry class. One new member was added at this meeting.

(Editor's note: See questions and answers on another page of this issue.)

INDIANAPOLIS.

Meets second Saturday of each month at Hotel Dennison. Secretary, Louis Mertz, 925 Chadwick Street, Indianapolis, Ind.

The regular meeting of Indianapolis Branch was held Oct. 30th, 1915.

Louis Mertz was elected secretary.

The members voted in favor of changing our meeting night from the last Saturday in the month to the second Saturday in the month, beginning Nov. 13th, 1915.

BRIDGEPORT.

Meets third Friday of each month at the office of the Brass World, 260 John Street, Bridgeport, Conn. Secretary, Nelson Barnard, 858 Howard Ave., Bridgeport, Conn.

NEWARK.

Meets first and third Friday of each month, 8 p. m., 47 Bank Street, Newark, N. J., Secretary, Geo. Keuter, Jr., 335 S. 19th Street, Newark, N. J.

At the meeting held on Nov. 5th, a practical demonstration and lecture on the metal cyanides was given and proved interesting.

Several papers were also presented and discussed on the electro deposition of metals.

CINCINNATI.

Meets once each month at Dennison Hotel, Cincinnati, Ohio. Secretary, F. H. Nordmann, 720 Froom Ave., Cincinnati, Ohio.

ROCHESTER.

Meets second and fourth Friday of each month at University of Rochester. Secretary, C. V. Haring, 603 Dewey Avenue, Rochester, N. Y.

PHILADELPHIA.

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Streets. Secretary, Philip Uhl, 2432 North Twenty-ninth Street, Philadelphia.

The regular monthly meeting of this branch was held at the University of Pennsylvania, Friday, Nov. 5th. This being an open meeting there was a good attendance to hear Dr. Lukins lecture on the electro deposition of nickel. After which the doctor answered questions on the subject asked by those present. At the conclusion Dr. Lukins was given a vote of thanks. This lecture will be published in the Review.

The communication of the Executive Board regarding admitting assistant foremen to the society was read and after due reconsideration this branch voted in favor of retaining this amendment

The banquet of this branch will be held at the Windsor Hotel, Saturday, Dec. 4, 1915. 8 p. m. The committee is working hard to make this a success and expects a good attendance.

TOLEDO.

Meets the last Tuesday of each month at Toledo University. Secretary, James E. Nagle, 209 Navarre Ave., Toledo, Ohio.

On Friday, the 5th, Toledo Branch met and voted unanimously against the amendment to take assistant platers into the society.

The class in chemistry is progressing very well and the members who are in the class are plugging away and taking advantage of the opportunity before them. We have a splendid laboratory and we are entered in the University as a class in the chemistry of electro plating. We have started in on basic analysis and while it is rather hard for us the class is doing fine and the laboratory work is certainly interesting to every one of us.

DAYTON.

Meets first Wednesday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Ilphonz Lamourcux, 500 East First Street, Dayton, Ohio.

The regular November meeting of Dayton Branch was held on Wednesday evenin, Nov. 3, at 8 p. m., with a large and enthusiastic attendance. At our October meeting the boys voted unanimously as being in favor of the 35 per cent per capita, with a continuance of the Monthly Review and at this meeting they all voiced themselves as being in favor of leaving the amendment passed at our recent convention relative to the assistant foreman being admitted to our society as active members stand as it was passed.

After disposing of all regular business Fidvarian Stephens introduced his paper upon the "Chemical Reactions of a Nickel Solution," which brought out some very interesting arguments as to the various actions of nickel solutions, such as pitting, pealing and plating dark spots. After discussing same until a very late hour the meeting was adjourned until the December meeting.

BUFFALO.

Meets first Saturday o feach month at the University of Buffalo, 8 p. m. Secretary, John G. Murphy, 71 Dingens Street, Buffalo, N. Y.

ST. LOUIS.

Meets fourth Saturday of each month at Public Library Assembly Rooms. Secretary, F. C. Rushton, 4405 Blair Avenue, St. Louis, Mo.

At the last meeting of this branch the question of a chemistry class was again taken up and after considerable discussion it was decided that the best plan would be to establish a laboratory centrally located, to which any member could have access at any time, a special meeting being called for the following Saturday to further discuss the matter. President H. H. Williams invited the members to meet at his home. After business had been attended to the members were treated to an enjoyable Hollowe'en repast by their host.

CLEVELAND.

Meets last Saturday of each month at Central Y. M. C. A. Secretary, Charles Werft, 331 Strathmore Avenue, Cleveland, Ohio.

The following papers were read before the Cleveland Branch at its last meeting: One by Mr. Wadsworth on "The Plating of Die Castings," and one by Mr. Scott on the "Coloring of Metals."

CHANGE OF ADDRESS.

Wm. J. Bell ..... 707 N. 35th St., Philadelphia, Pa.
E. L. Bishop ..... 6627 Vernon Ave., Chicago, Ill
J. Wooldridge ..... Box 486, Carleton Place, Ontario, Can.
T. C. Eichstadt ..... Care Y. M. C. A., Butler, Pa.

APPLICATIONS FOR MEMBERSHIP.

Detroit Branch.

S. P. Brockway ..... 318 Hendric Ave., Detroit, Mich.

Cleveland Branch.

Andrew Somerville ..... 5828 Diamond Ave., Cleveland, Ohio
Frank E. Peters ..... 6316 Linwood Ave., Cleveland, Ohio

Chicago Branch.

Chas. A. Barnes ..... 217 W. Illinois St., Chicago, Ill.

Toronto Branch.

Philip J. Cooper ..... 241 Roxton Rd., Toronto, Ont.
Wm. Henry Cresswell ..... 58 Symington Ave., Toronto, Ont.
T. Edgar Riggs ..... 184 Sumach St., Toronto, Ont.

ELECTED TO MEMBERSHIP.

Philadelphia Branch.

Wm. P. Scott ..... 415 Bulletin Bldg., Philadelphia, Pa.
Harry Leaser ..... 132 Bridge St., Spring City, Pa.

Toronto Branch.

James R. Moore ..... Box 200, Carleton Place, Ontario, Can.
Thomas G. O'Keefe ..... 676 Huron St., Toronto, Ontario, Can.
John Sougheed ..... 339 Lippincott St., Toronto, Ontario, Can.

Detroit Branch.

C. S. Tompkins ..... 595 17th St., Detroit, Mich.
W. P. Manning ..... 413 Pine St., Providence, R. I.
A. F. Hallway ..... Cadallac Motor Car Co., Detroit, Mich.

New York Branch.

Marshall E. Stewart ..... Hotel Westminster, Perth Amboy, N. J.

THE STORY OF THE PLATERS.

By H. J. RICHARDS.

In those days there dwelt in the land certain men, cunning in metal plating, skilled in making iron or brass to look like silver or gold. Now some of these men were exceedingly wise and some were foolish. Yet the wise were sometimes foolish and the foolish sometimes waxed exceedingly wise. Now certain of these men said to each other, Let us take counsel one with the other, so that we may be always wise. This foolishness is fierce and leadeth but to the dippy house. Behold, the platers in far off lands can give us cards and spades and the 15 ball. Let us therefore listen to the words of these wise men from the East, so that we all may become wise. And it was so. Now behold the wisdom of these men became known over the whole land, even to the Wild and Wooly West, and the land in the far North, beyond the Great Waters. Now the platers in these lands said one to the other, behold, let us too take counsel with the Wise Men from the East, so that we too may become wise. And it was so. So the platers in the whole land took counsel one with the other and waxed exceedingly wise. And it came to pass that these platers said, Let us choose a scribe to cause writings to be kept of the great words of the counsellors, so that they may not be lost, so that those writings may go to all platers. And it was so. Now there arose at that time certain medicine men who said unto all platers. Behold, I have nickel salts which contain great medicine, which maketh the nickel to plate with exceeding swiftness. Give me therefore much gold for this great medicine which maketh other nickel salts look like 30 cents with the three rubbed out. Now these strange things caused many platers to be exceedingly troubled. Some said these things are even so. Yet other platers said, there things sound to us exceedingly fishy. Yet all were glad that they had listened to the wise men from the East and taken counsel one with the other, for it was even found that some of these salts did contain great medicine, while the claims of others were made to conceal gold bricks of exceeding size. Now of the further doings of these wise men and how they were ruled with great skill by the great chiefs, Proctor, Hogaboon and Hans the Chosen, and how they were lead to the great country of the Ohio to the Land of the Daytonites, I will tell you in my next book.